plete regeneration. All fragments which continue to divide contain both macro- and micronuclear material. It has been impossible to produce an amicronucleate race by artificial means.[1]

In *Spathidium*, where the two nuclear elements extend throughout the cell both during and after fission, there is no difference in the regenerative power at any peroid of asexual life. In *Blepharisma*, however, where large amacronucleate fragments may be obtained during the process of division, it has been found that temporary restoration of external organelles is possible in the absence of nuclear material, if the formation of a new peristome has already been started. Dedifferentiation immediately follows and death occurs in a few days. The presence of micronuclei in such fragments, moreover, is not sufficient for continued existence.

During conjugation, complete regeneration in *Spathidium* is less frequent than during asexual life. Portions containing the synkaryon regenerate and divide; other pieces remain unchanged or undergo only temporary restoration of form. Fragments obtained from starved *Spathidia* prior to encystment either fail to regenerate, or regain normal form and subsequently encyst.

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The almond as a source of the A vitamin.

By **MARY SWARTZ ROSE** and **GRACE MACLEOD.**

[*From the Department of Nutrition, Teachers College, Columbia University, New York City.*]

Investigations by Cajori have shown that the almond furnishes proteins adequate for growth, reproduction, and the suckling of young, and the B vitamin in liberal amounts.[2] Coward and Drummond have reported an experiment on three rats, of fourteen days' duration, in which one gram per day of almond was added to a basal ration devoid of the A vitamin, which indicates that this amount of nut does not furnish a sufficient supply of A vitamin for growth of albino rats,[3] but so limited an experi-

[1] Woodruff and Spencer, *Journ. Exper. Zoöl.*, 1922, Vol. 35.

[2] Cajori, *Jour. Biol. Chem.*, 1920, xliii, 583–606.

[3] Coward and Drummond, *Biochemical Journal*, 1920, xiv, 665.

ment is hardly to be regarded as conclusive, especially in view of the fact that the animals did not eat the almond very readily.

In the present investigation, attempts were first made to feed a diet of ground unblanched almonds, supplemented by a suitable salt mixture and a little starch, the almonds constituting 81 per cent. of the diet by weight. The records of daily food intake show that this diet was eaten in about the same amounts as the control diet, and the average calorie intake was higher than for the control diet. However, young rats placed on this diet at the age of about six weeks made no gains in weight in six or seven weeks. The addition of 2 grams of fresh compressed yeast to the ration of each rat caused a slight temporary increase in weight, but no permanent gain.

Thinking that there might be some inhibiting factor in the integument, as reported by Cajori in the case of the pecan,[1] the nuts were blanched before grinding and supplemented as in the case of the unblanched almonds, with no better results.

It then seemed probable that the high fat in the diet was the disturbing factor, and a press cake containing about 35 per cent. fat was used in making up a diet with the same protein and salt content as the original almond diet. The animals remained in somewhat better condition on this diet, showing less roughness of coat, but they declined steadily in weight.

A basal ration was then prepared consisting of meat residue, starch, lard, yeast and a suitable salt mixture, and containing the same percentage of protein as the almond diet. When young rats were fed this ration until they ceased to increase in weight (about four or five weeks), and then put on the same plus three per cent. of the blanched almond diet, they immediately began to gain in weight, and continued to grow well for five or six weeks. They then ceased to grow or declined in weight. Similar experiences were had with 5 per cent. blanched almond diet added to the basal ration. In case of three rats, increases to 10 per cent. of the almond mixture and later to 15 per cent. were followed by further growth. Considering the very good growth with only 3 per cent. of the almond mixture added to the basal diet, almonds would seem to be fairly rich in the fat-soluble A vitamin. The

[1] Cajori, *Jour. Biol. Chem.*, 1921, xlix, 389–397.

unfavorable effects of larger quantities of almond appear to be due to some harmful substance which is not in the integument but in the kernel itself. Since the results with press cake were almost identical with those from feeding the whole nut, it seems unlikely that the sole difficulty was the large amount of fat, though undoubtedly young animals will not thrive with a high amount of fat in the diet. We have repeatedly seen the coats of young rats look as if they had been dipped in water twelve to twenty-four hours after feeding almonds or peanuts. Unfavorable influences in the case of the peanut are also recorded by Daniels and Loughlin[1] and attributed to high fat.

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A note on the use of ammonium chloride in gastric tetany.

By WILLIAM S. McCANN.

[*From the Chemical Division, Medical Clinic, Johns Hopkins Hospital, Baltimore, Md.*]

Studies of the experimental tetany produced by pyloric obstruction made by MacCallum[2] showed clearly a reduction in plasma chloride and a coincident increase in the CO_2 combining power of the blood plasma. A publication of a similar nature[3] called attention to this latter feature, but not to the reduction of plasma chloride content. The priority in experiments clearly belongs to MacCallum. Both reports agree in the interpretation that the primary disturbance is due to a loss of chloride through the gastric secretions. The therapeutic results obtained in experimental animals by replacing chloride ions either by injection of NaCl intravenously,[2] or HCl into the duodenum,[3] were good.

More recently attention has been called by Haldane[4] to the effects of administration of ammonium chloride by mouth. This substance when ingested produces an acidosis resulting in lowered CO_2 combining power of plasma, and an increased excretion of acid. The most probable explanation is that the ammonia is

[1] Daniels and Loughlin, *Jour. Biol. Chem.*, 1918, xxxiii, 295–301.

[2] MacCallum, Lintz, Vermilye, Leggett and Boas, *Bull. Johns Hopkins Hosp.*, 1920, xxxi, I.

[3] McCann, Wm. S., *Journ. Biol. Chem.*, 1918, xxxv, 553.

[4] Haldane, J. B. S., *Journ. Physiol.*, 1921, lv, 265.